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Notice of Allowability	Application No.	Applicant(s)	
	09/963,471	TOMOFUJI ET AL.	
	Examiner	Art Unit	
	Leslie Pascal	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment of 1-27-06.
2. ☒ The allowed claim(s) is/are 1-3,14,17 and 19-31.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

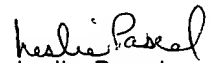
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |


Leslie Pascal
Primary Examiner
Art Unit: 2633

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Deidre M. Davis on 2-10-06.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leslie Pascal whose telephone number is 571-272-3032. The examiner can normally be reached on Monday, Friday 6:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

The application has been amended as follows:

Claims 19-31 have been presented as new claims as follows:

Application Serial No. 09/963,471

19. (new) An optical device having an optical branching filter to separate the wavelength division multiplexed signal lights on a wavelength group-by-group basis, and an optical multiplexer functionally connected to the branching filter, for synthesizing the signal lights which have been separated on a wavelength group-by-group basis, wherein

the optical branching filter comprises:

a first branching filter that separates signal lights into first wavelength groups and second wavelength groups consisting of the wavelength groups that do not come into contact with the wavelength groups that form the first wavelength groups, wherein each group comprising of a plurality of wavelength groups which do not neighbor the wavelength groups, belonging to the other group on the wavelength axis;

a second branching filter that separates each of the separated first and second wavelength groups into signal lights having a plurality of different wavelengths included in the wavelength groups that make up each wavelength groups, and wherein

the optical multiplexer comprises:

a first multiplexer that synthesizes the signal lights separated by the second branching filter, for each of the first and second wavelength groups, sequentially into corresponding wavelength groups; and

a second multiplexer that synthesizes sequentially the wavelength groups making up the first and second wavelength groups synthesized by the first multiplexer.

20. (new) The optical device according to claim 19, wherein

the first branching filter and the second multiplexer are each formed from a plurality of circulator circuits that are connected in series, each having a fiber grating and a circulator to be provided so as to match individual wavelength groups, and wherein

the second branching filter and the first multiplexer are each formed from a plurality of dielectric multilayer film filters that are connected in series and provided so as to match the individual wavelength groups.

21. (new) An optical device having an optical branching filter to separate the wavelength division multiplexed signal lights on a wavelength group-by-group basis, and an optical multiplexer functionally connected to the branching filter, for synthesizing the signal lights which have been separated on a wavelength group-by-group basis, wherein

the optical branching filter comprises:

Application Serial No. 09/963,471

a first branching filter that sequentially separates the wavelength division multiplexed signal lights of even numbered or odd numbered wavelength groups on a wavelength group-by-group basis; and

a second branching filter that sequentially separates the wavelength division multiplexed signal lights of the odd numbered or even numbered wavelength groups corresponding to the remaining signal lights of the signal lights separated by the first branching filter, on a wavelength group-by-group basis, wherein each group comprising of a plurality of wavelength groups which do not neighbor the wavelength groups, belonging to the other group on the wavelength axis, and

wherein

the optical multiplexer comprises:

a first multiplexer that sequentially synthesizes the signal lights of the odd numbered or even numbered wavelength groups separated by the second branching filter; and

a second multiplexer that sequentially synthesizes the signal lights of the even numbered or odd numbered wavelength groups separated by the first branching filter.

22. (new) The optical device according to claim 21, wherein

the first branching filter and the second multiplexer are each formed from a plurality of circulator circuits that are connected in series, each having a fiber grating and a circulator to be provided so as to match individual wavelength groups, and wherein

the second branching filter and the first multiplexer are each formed from a plurality of dielectric multilayer film filters that are connected in series and provided so as to match the individual wavelength groups.

23. (new) An optical device having an optical branching filter to separate the wavelength division multiplexed signal lights on a wavelength group-by-group basis, and an optical multiplexer functionally connected to the branching filter, for synthesizing the signal lights which have been separated on a wavelength group-by-group basis, wherein

the optical branching filter comprises:

a first branching filter that separates signal lights into the wavelength division multiplexed signal lights of the odd numbered wavelength groups and the signal lights of the even numbered wavelength groups; and

Application Serial No. 09/963,471

a second branching filter that separates the signal lights of the odd numbered and even numbered wavelength groups separated by the first branching filter, into respective wavelength groups,

wherein each group comprising of a plurality of wavelength groups which do not neighbor the wavelength groups, belonging to the other group on the wavelength axis, and wherein

the optical multiplexer comprises:

a first multiplexer that synthesizes the signal lights separated into the respective wavelength groups by the second branching filter, into the even numbered wavelength groups and the odd numbered wavelength groups, respectively; and

a second multiplexer that synthesizes the signal lights of the even numbered wavelength groups and the signal lights of the odd numbered wavelength groups synthesized by the first multiplexer.

24. (new) The optical device according to claim 23, wherein the first branching filter and the second multiplexer are formed from interleaver filters, and wherein the second branching filter and the first multiplexer are formed from a plurality of dielectric multilayer film filters that are connected in series and provided so as to match the individual wavelength groups.

25. (new) The optical device according to claim 24, wherein the interleaver filter comprises a multistage connection of Mach-Zehnder type filters.

26. (new) An optical device having an optical branching filter to separate the wavelength division multiplexed signal lights into groups on a wavelength group-by-group basis, wherein each group comprising of a plurality of wavelength groups which do not neighbor the wavelength group, belonging to the other group on the wavelength axis, and an optical multiplexer functionally connected to the branching filter, for synthesizing the signal lights which have been separated on a wavelength group-by-group basis, wherein

the optical branching filter comprises:

an optical isolator;

an optical coupler that branches into two the signal lights that have been wavelength multiplexed through the optical isolator,

Application Serial No. 09/963,471

a first fiber grating connected to one output of the optical coupler, for blocking the even numbered wavelength groups of the wavelength division multiplexed signal lights;

a second fiber grating connected to the other output of the optical coupler, for blocking the odd numbered wavelength groups of the wavelength division multiplexed signal lights;

a first separating filter that separates the signal lights of the odd numbered wavelength groups outputted from the first fiber grating to respective wavelength groups; and

a second separating filter that separates the signal lights of the even numbered wavelength groups outputted from the second fiber grating.

27. (new) The optical device according to claim 26, wherein the first separating filter and the second separating filter are each formed from a series connection of a plurality of dielectric multilayer film filters.

28. (new) The optical device according to claim 21, wherein the number of wavelengths included in the individual even numbered or odd numbered wavelength groups to be separated by the first branching filter is less than the number of wavelengths included in the respective odd numbered or even numbered wavelength groups.

29. (new) An optical device comprising:

a first branching filter to input wavelength division multiplexed signal lights and separate the signal lights into a first wavelength band and other wavelength bands;

a second branching filter to input lights separated into the other wavelength bands by the first branching filter, and separate the lights into a second wavelength band different from the first wavelength band and other wavelength bands that do not come into contact with wavelength groups that form the first wavelength band, and

wherein each group comprising of a plurality of wavelength groups which do not neighbor the wavelength groups, belonging to the other group on the wavelength axis; and

a second wavelength device to input the lights of the second wavelength band extracted by the second branching filter, the second wavelength device outputting at least the second wavelength band to the first multiplexer, wherein

the first multiplexer synthesizes lights separated into the first wavelength band by the first branching filter and the lights from the second multiplexer and outputs the synthesized lights.

Application Serial No. 09/963,471

30. (new) The optical device according to claim 29, further comprising:

a third branching filter to separate lights, at least, into a wavelength band lying between the first and second wavelength bands and other bands; and

a third multiplexer to input the lights of the wavelength band lying between the first and second wavelength bands separated by the third branching filter, the third multiplexer outputting at least the lights of the wavelength band between the first and the second wavelength bands to the second multiplexer, wherein the second multiplexer synthesizes the lights of the second wavelength band from the second branching filter and the lights from the third multiplexer, and outputs the synthesized lights to the first multiplexer.

31. (new) An optical device comprising:

means for receiving a WDM signal comprising a plurality of even numbered and a plurality of odd numbered groups of wavelength signals multiplexed together and sequentially separating the wavelength division multiplexed signal lights of the plurality of even numbered or the plurality of odd numbered wavelength groups from the WDM signal;

means for sequentially separating the remaining wavelength division multiplexed signal lights of the plurality of the even numbered or the plurality of odd numbered wavelength groups,

wherein each group comprising a plurality of wavelength groups which do not neighbor the wavelength groups, belonging to the other group on the wavelength axis;

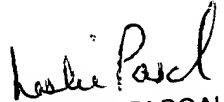
means for sequentially synthesizing the remaining signal lights of the wavelength groups separated; and

means for sequentially synthesizing the signal lights of the wavelength groups initially separated from the WDM signal.

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